I. INTRODUCTION

Location

Allensworth is a small rural community located in southwestern Tulare County in Sections 9 & 16, Township 24 South, Range 24 East, M.D.B. & M. Allensworth was founded in 1908 and is located where once was the southeastern edge of the ancestral Tulare Lake. Allensworth has an estimated population of approximately 471 people. Water is served to the community by the Allensworth Community Services District (ACSD) which was established in 1981. The District is bounded by Avenue 24 to the south, Highway 43 to the east, its western boundary extends approximately 1/8-mile west of Young Road, and its northern boundary extends approximately ½-mile north of Avenue 39. Its service area encompasses approximately 804 acres and is comprised of 167 Estimated Dwelling Units (EDU) consisting of 146 occupied households, one school, and the Allensworth State Historic Park.

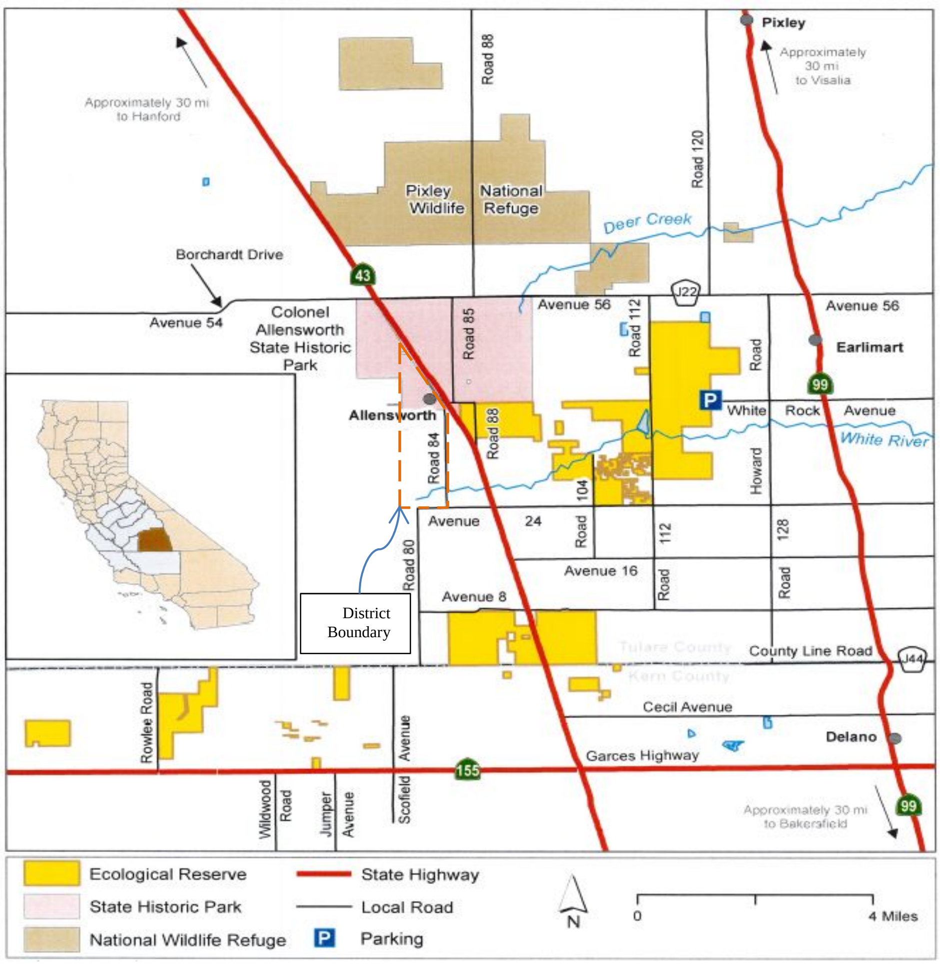

Figure 1

Vicinity Map – Allensworth, California

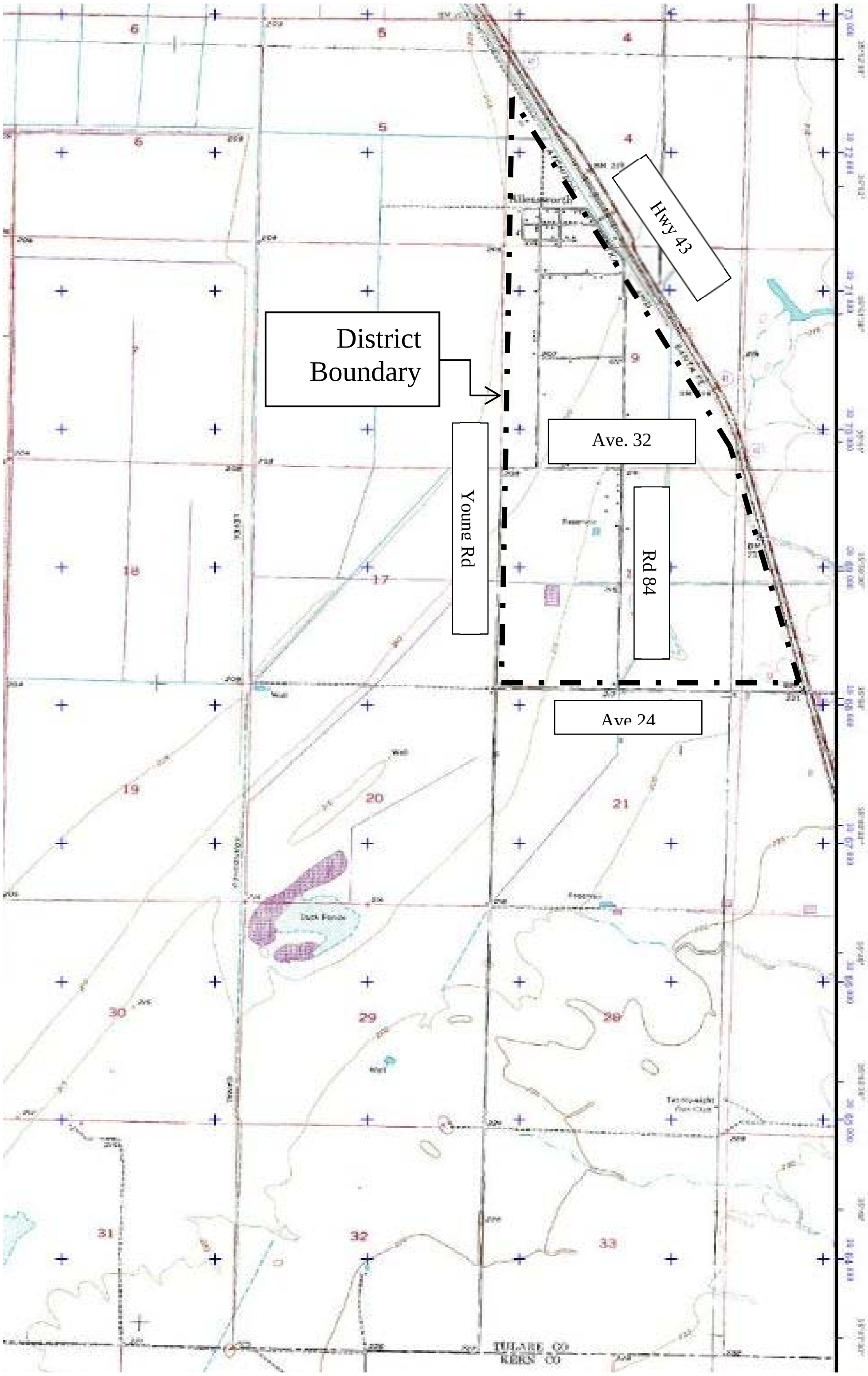

Figure 2

Topographical Map – Allensworth, California

Environmental Resources

The town of Allensworth is located in the southern San Joaquin Valley approximately 3 miles north of the Tulare-Kern County Line. It is a semi-arid climate surrounded by agricultural land uses. The Allensworth Ecological Reserve is adjacent to the community to the east and the State Historic Park is directly adjacent to the north. In addition, the Pixley National Wildlife Refuge is just north of the Allensworth community.

The project area will primarily consist of a new well site and a new tank site. These areas will be addressed after the site locations are determined and a test well has been completed. The CEQA work is anticipated to be a Mitigated Negative Declaration.

The groundwater aquifer in the area is quite thick with groundwater wells in the area exceeding 1,000 feet in depth. The estimated maximum thickness of freshwater-bearing deposits is approximately 4,400-feet. The primary groundwater quality issue in the area is Arsenic and the history of this contamination is outlined in Section III herein.

Growth and Population Trends

The 2010 United States Census reported that Allensworth has a population of 471 people. The 2000 United States Census estimated the Allensworth population to be 336 persons.

Table 2
Growth Projection

Year	Population
2000	336
2010	471
2020	670
2030	954

This indicates that the annual growth rate for the community is approximately 4%. At this rate, the population would be 670 by 2020 and 954 by 2030.

Community Engagement

Monthly updates of the project progress and planning phase are being provided to the Allensworth Community Services District Board and to the community at each monthly board meeting. If a Proposition 218 vote is necessary as a result of project costs, then workshops would be held to explain the project, the project need, and the project costs to the residents of the community.

II. EXECUTIVE SUMMARY

The Allensworth community is in need of a safe and reliable water supply that meets all Drinking Water Standards. Currently the system has two water supply wells that exceed the Arsenic maximum contaminant level (MCL) of 10 ppb. In addition to this, the system is in need of other improvements including additional storage, well site security, and remote monitoring and control of water supply facilities. This report considers four alternatives to address the above issues which are:

Alternative 1 - Upgrade the Current Facilities
Alternative 2 - Connect to a Nearby Water System
Alternative 3 - Construct Arsenic Treatment
Alternative 4 - Construct a New Well

Each alternative includes costs to provide additional system storage, well site security, and SCADA communication. The cost of each alternative is shown in the table below.

	ALTERNATIVE			
	1	2	3	4
Capital Cost[1]	NA	$4,500,000-6,500,000	$3,299,140	$2,456,700
Present Worth of Capital Plus 20-yr Operating Cost	NA	$4,720,970-6,720,970	$4,634,170	$2,540,510
Annual O&M Cost	NA	$12,000	$72,500	$6,000
Feasibility (yes / no)	No	Yes	Yes	Yes
Technical Effectiveness (1 to 5, 1 = Best)	NA	2	3	1
Rank	NA	**2**	**3**	**1**

Monthly Operating Cost per EDU

	2	3	4
Existing O&M[2]	$53.45	$53.45	$53.45
Existing Loan Payments[3]	$3.42	$3.42	$3.42
TOTAL EXISTING	**$56.87**	**$56.87**	**$56.87**
Proposed Project O&M[4]	$5.99	$36.18	$3.00

TOTAL WITH PROJECT	**$62.86**	**$93.05**	**$59.87**
New USDA Project Loan (Capital Cost @ 6.5%, 25-yr term)	$181.84-$262.81	$133.39	$99.33
TOTAL INCLUDING NEW USDA LOAN	**$244.70-$325.67**	**$226.44**	**$159.20**

TABLE – Cost Summary

1. Detailed cost estimates are attached. Alternative #2 is shown as a cost range as this report has only made a cursory analysis of this alternative for discussion purposes. A more detailed analysis of this alternative is being performed under a separate study through the County of Tulare. The costs for this alternative are anticipated to be shared by the project participants on a prorated basis.
2. Existing O&M = Current Yearly O&M of $107,117 / 12 months / 167 EDU.
3. Existing USDA Loan Payment = $6,845 / 12 months / 167 EDU. Payment amount shown is approximate.
4. Project O&M = [annual O&M cost] / 12 months / 167 EDU.

Detailed cost estimates for these alternatives are attached. Alternative 4 has the lowest present worth value when considering capital cost together with 20-year operating costs.

The recommended project alternative is Alternative 4: construct a new well with a 500,000 gallon welded steel storage tank, well site security measures, and a SCADA monitoring system. This is predicated on the successful completion of a test water well demonstrating that a well can be completed that meets all Title 22 Drinking Water Standards. A shallow test well is proposed to the west of the existing Well No. 2. If this test well indicates treatment cannot be avoided then a second test well is proposed to the east of Well No. 1 if the planning budget allows.

If a test well indicates treatment can be avoided and the well capacity is greater than 100 gpm then Alternative 4 is the recommended alternative. If treatment is deemed to be unavoidable then the recommended alternative would become Alternative 2 which is connection to the Angiola Water District.

Currently ACSD is performing engineering work as a separate project to test Well No. 2 to determine if a portion of the well may be eliminated or isolated in order to lower the Arsenic concentration below 10 ppb. The water quality results of the test well and the results of the Well No. 2 testing/modifications will determine if the existing wells can be maintained and blended in the storage tank to Arsenic levels below 8 ppb.

ACSD is also having a separate engineering study performed through the County of Tulare to evaluate the connection of the Allensworth CSD and the Alpaugh CSD to the Angiola Water District. As information becomes available from that study, the costs and information provided herein related to Alternative No. 2 will be updated. Therefore an estimated cost range has been shown for Alternative No. 2. If this alternative were selected for the project, it is anticipated that the project costs would be shared by each of the project participants, thus reducing the cost responsibility of this alternative to the Allensworth CSD.

III. EXISTING FACILITIES

Location Map

A system map for the ACSD is shown on Figure 3 and 4 below.

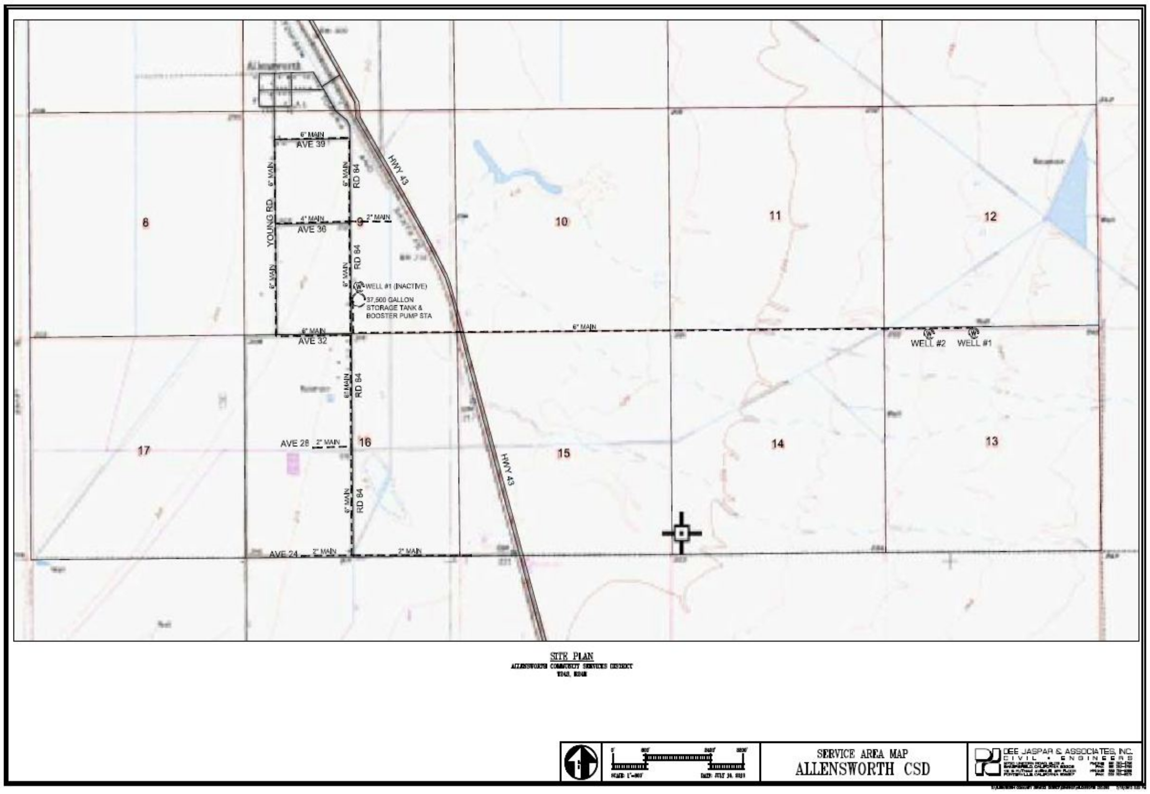

Figure 3

System Map – Allensworth Community Services District & Supply Wells
(Larger Map appended hereto)

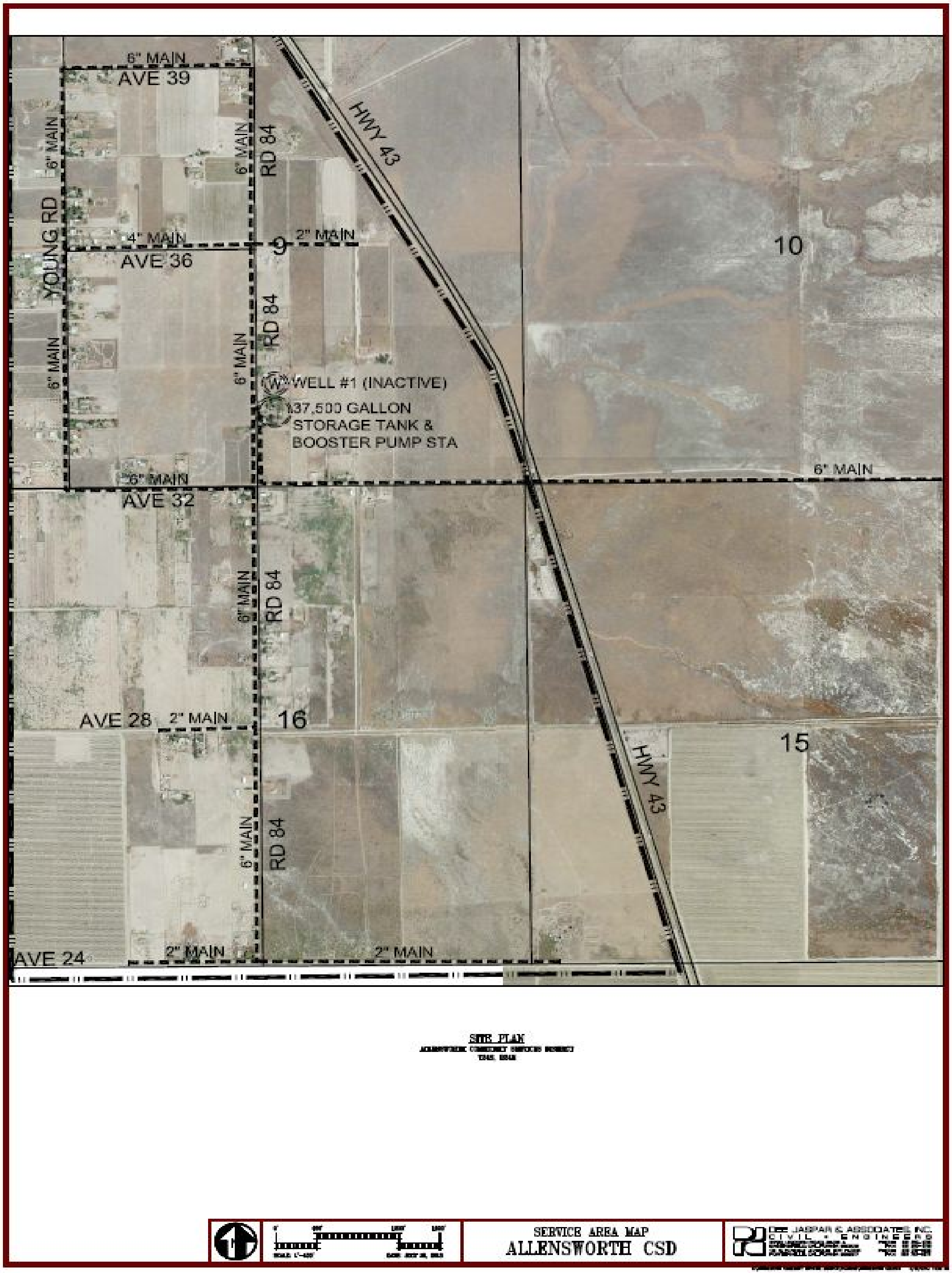

Figure 4

System Map – Allensworth Community Services District
(Larger Map appended hereto)

The two groundwater supply wells for the District are located approximately 3 miles east of the Allensworth Community. The water from each of the wells is conveyed through a 6-inch pipeline, 3 miles in length, to fill an approximate 42,000 gallon welded steel storage tank (21-ft diameter by 16-ft tall). Water is pumped from the storage tank into the distribution system through a booster pump station and 5,000 gallon hydropneumatic tank. The booster pump station is equipped with three small end suction booster pumps, two 10 hp pumps and one 15 hp pump.

The distribution system piping consists of a 6-inch loop along Road 84, Avenue 39, Young Road, and Avenue 32. A 6-inch main is installed along Avenue 36 from Young Road to Road 84. A 2-inch main extends east on Avenue 32 and 36 beyond Road 84. In addition, a 6-inch main is installed south of Avenue 32 along Road 84 to Avenue 24. There are three 2-inch mains installed from this 6-inch main with one 2-inch main at Avenue 28 west of Road 84, a 2-inch main at Avenue 24 west of Road 84, and a 2-inch main at Avenue 24 east of Road 84. The distribution system serves fire hydrants and 148 metered service connections.

<u>History & Condition of Facilities</u>

ACSD receives 100% of its water supply from groundwater. The Allensworth area has been known to have water quality problems since 1966. In September 1982, the California Department of Health Services documented the existing water system and historic developments. These are summarized below.

Since 1966 Allensworth residents have been using groundwater which consistently exceeded the Safe Drinking Water Standards for arsenic (50 ppb at that time). The concentrations of fluoride, iron, and manganese had also periodically exceeded their respective limits. There were also no fire hydrants or other fire protection systems within the community.

1966-1967

The Allensworth Membership Water Company applied to the Farmers Home Administration for financial assistance for the construction of a domestic water supply system for the Allensworth area. From this application and subsequent funding, the following sequence of events occurred: the Department of Water Resources determined suitability of groundwater in the area for domestic use, the State Department of Health provided the water system design, the Tulare County Health Department provided follow-up for system installation and routine regulatory responsibility.

1967

A new domestic well was drilled for the community of Allensworth. The 10-inch diameter well was perforated between depths of 1,100-ft and 1,300-ft, and the annulus was sealed to a depth of 500-ft. A mineral analysis of the water sample

taken at the end of the well's development indicated an arsenic concentration of 110 ppb. The well yield as of October 21, 1975 was 236 gpm. This well remained as the sole source of supply and was high in arsenic and fluoride.

1968
A pH control chemical feed pump was installed at the well and 35 reverse osmosis units were installed throughout the system for arsenic removal inside each home.

1968-1970
The Tulare County Health Department began collecting monthly random samples from the reverse osmosis units within the individual homes for arsenic and pH values. Results of testing indicated that both the pH control at the well and the reverse osmosis units were not being properly maintained. Progressive increases in arsenic concentrations indicated that most of the membranes of the treatment units had failed. Attempts by the State and County Health Departments to get the water utility to provide the necessary operation and maintenance to reduce arsenic concentrations were unsuccessful.

1972
The Allensworth Townsite was designated a State Historical Park within the State Park System. To date, the State has acquired all of the original townsite of Allensworth, established a visitor center in the area, and has developed plans and is in the process of developing the area as a State Historic Park.

1981
With assistance from Self-Help Enterprises, the community of Allensworth formed a Community Services District. This was necessary to establish eligibility for application to the State Department of Water Resources for funding as well as to make needed water system improvements under the Safe Drinking Water Bond Law of 1976 grant program.

1982-1984
A groundwater study of the Allensworth community was conducted by James M. Montgomery, Consulting Engineers, Inc. This study concluded that water quality was better to the east and southeast of Allensworth and that low arsenic groundwater was available from aquifer zones above 230-ft. As such Well #1 was completed in 1984 by Myers Brothers, Inc. The well was constructed to a total depth of 245-ft with a perforated interval from 185-ft to 240-ft (60 slot). The well has a surface seal to a depth of 170-ft. This well currently produces approximately 140 gpm. At the time of completion the Arsenic concentration was below the maximum contaminant level (MCL) of 50 ppb, however the Arsenic concentration ranges from 11 ppb to 14 ppb and is out of compliance with the current MCL of 10 ppb.

1998-1999
A grant and loan from the Rural Utilities Service (RUS) administered by the U.S. Department of Agriculture (USDA) was provided to rehabilitate the existing Allensworth Community Services District water system. As part of this project, upgrades were made to the existing storage tank and booster pump station, replacement of the system distribution piping with 6-inch main lines as currently exists today, installation of fire hydrants, and construction of a new water supply well – Well #2. The Well #2 was constructed to a total depth of 315-ft with perforated intervals from 100-ft to 150-ft, 170-ft to 240-ft, and 270-ft to 305-ft. The well has a surface seal to a depth of 90-ft. This well currently produces approximately 130 gpm. The Arsenic concentration ranges from 7 ppb to 14 ppb.

Table 3
System Summary

System Component	Year Constructed	Year Renovated	Desc. Of Renovation
1967 Well	1967	NA	NA
Well No. 1	1984	NA	NA
Well No. 2	1999	NA	NA
Storage Tank	1985	NA	NA
Pump Station	1985	1999	Modified Tank Fill Line, Installed New Pressure Vessel, and Plant Piping Changes
Pipelines	1967/1984	1999	Replaced 6" Mainlines

Condition of Existing Facilities

a. Water Supply

The supply for the Allensworth Community Services District is met from two existing water supply wells – Well No. 1 and Well No. 2. The location of these wells is shown on Figure 3 herein.

Table 4
Well Summary

Well Name	1967 Well[1]	Well No. 1	Well No. 2
Flow Rate (gpm)	NA	130	140
Motor Size (hp)	50	10	20
Pump Depth (ft)	NA	NA	260
Well Depth (ft)	NA	245	315
Well Yield (gpm)	NA	130	140
Well Casing Material	NA	Steel	Steel
Well Casing Diameter	NA	8"	12"
Age (yrs)	46	29	14
Regulatory Contaminants	Arsenic	Arsenic	Arsenic

[1]This well is no longer active and is recommended to be abandoned.

The condition of Well No. 1 and Well No. 2 appear to be adequate. There have been no complaints of sand or reduced capacity.

The adequacy of the two wells is a concern with respect to water quality. The wells routinely exceed the MCL for Arsenic and the community has a history of Arsenic problems. Well No. 1 was drilled in 1984 and is perforated from 185-ft to 240-ft below ground surface. The Arsenic concentration has varied between 10 ppb and 14 ppb since 2005. Well No. 2 was drilled in 1998 and is perforated from 100-ft to 150-ft, 170-ft to 240-ft, and 270-ft to 305-ft below ground surface. The Arsenic concentration has had several results that exceed the MCL since 2007 and typically ranges from 7 ppb to 14 ppb.

b. Water System Demand

The maximum day demand (MDD) for the ACSD system was estimated using two standards and historical water data. Utilizing Figure 14 of the California Waterworks Standards, Chapter 16 of Title 22 for 167 EDU's estimates the MDD at 200 gpm.

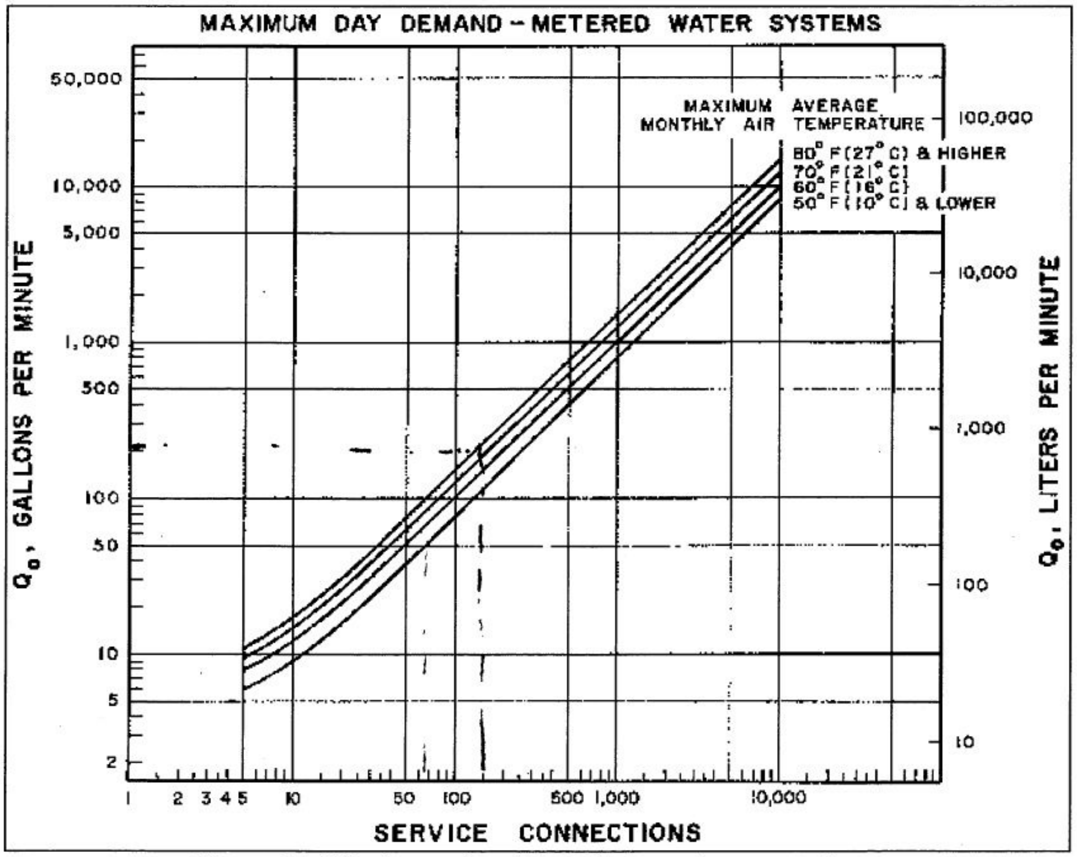

Figure 14: Maximum day demand vs. service connections

Figure 5

Figure 14 of the California Waterworks Standards

The Tulare County Improvement Standards estimate that the system should be capable of producing a MDD of 100 gpm. This is based on an estimate of 150 gallons per capita per day which equates to approximately 50 gpm for an average day demand. The maximum day demand was estimated using a factor of 2.0 as recommended by the Tulare County Improvement Standards.

Water production records for the ACSD system were also evaluated for the period from January 2010 through December 2012. This data indicates a MDD of approximately 150 gpm and a peak hour demand of 260 gpm, see Table 5. This information has been utilized for the report purposes as it is actual system operating data.

Table 5

Historical Water Demand

Allensworth Community Services District							
Historical Water Demand							
Year	Well No. 1	Well No. 2	Total Pumped	Storage Tank/Booster Pump Station	Average Day Demand (GPM)	Maximum Day Demand[1] (GPM)	Peak Hour Demand[2] (GPM)
2010	13,899,400.00	19,169,400.00	33,068,800.00	NA			
2011	21,081,600.00	13,800,700.00	34,882,300.00	34,738,400.00	66.09	132.19	231.32
2012	24,265,500.00	19,466,500.00	43,732,000.00	38,976,600.00	74.16	148.31	259.55

[1]Maximum Day Demand equal to 2x the Average Day Demand per County of Tulare Improvement Standards

[2]Peak Hour Demand equal to 3.5x the Average Day Demand per County of Tulare Improvement Standards

The system capacity between the two wells is approximately 280 gpm. It appears the two wells have enough capacity to meet the actual system demands and the demand as calculated per the California Waterworks Standards.

c. Water Supply Regulatory Compliance

The majority of the compliance orders are related to water quality for concentrations that exceed the maximum contaminant level for Arsenic and for total coliform levels as noted below. On December 24, 2011 the District did receive a "Boil Water Order" from the Tulare County Health & Human Services Agency as a result of a system pressure loss, see attached.

d. Water Quality

The current regulatory violations for the system stem from Arsenic concentrations that exceed the State of California MCL of 10 ppb for Arsenic. A copy of the Compliance Order No. 2010-39 from the County of Tulare Environmental Health Services Division is attached. The District has also received Notices of Violation for failing to provide quarterly Arsenic samples and for failing to comply with the total coliform MCL, see attached.

Copies of recent water quality analytical reports from the California Department of Public Health are attached.

e. Water Treatment Plant

The existing system does not currently have any treatment facilities.

f. Storage

The location and size of the existing water storage tank is shown in Figure 4 herein. The existing storage tank is rusting on the inside and is in need of repair. Repairs include fixing the liquid level gauge, providing a suitable

exterior access ladder, recoating the tank interior, and repainting the tank exterior.

Table 6

System Storage Summary

Storage Tank No.	**Tank No. 1**
Storage Capacity (gal)	42,000
Elevated or On-Grade	On-Grade (Flat Bottom)
Material	Steel (Painted)
Construction Type	Welded
Age (years)	29

The system storage is currently an approximate 42,000 gallons gross storage tank. Utilizing Figure 15 of the California Waterworks Standards, Chapter 16 of Title 22 for 167 EDU's estimates the required system storage at 200,000 gallons.

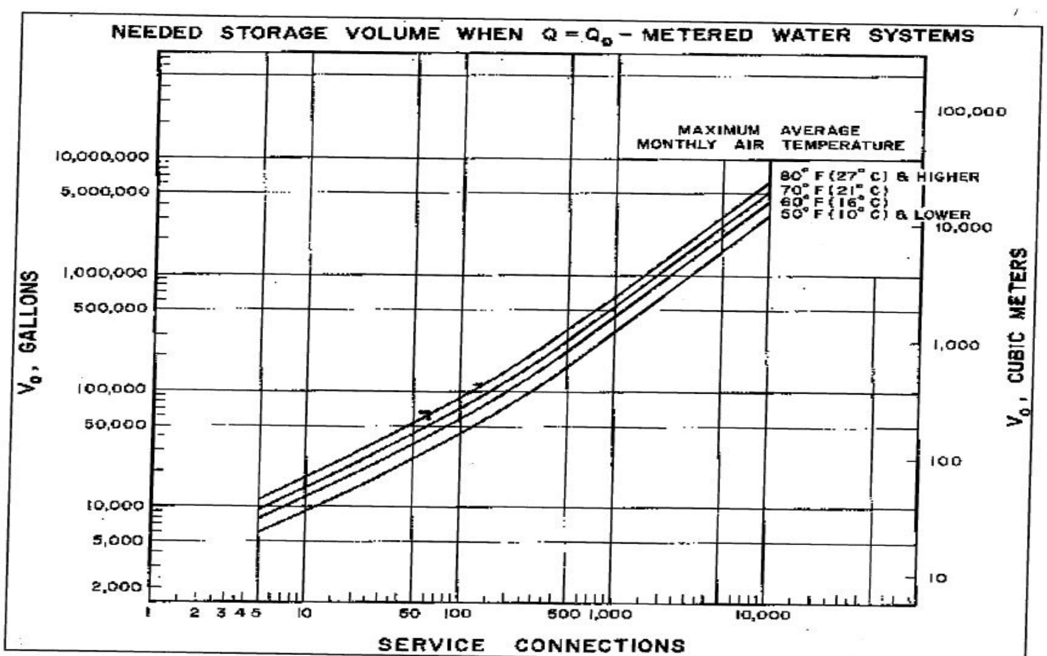

Figure 15: Needed storage vs. service connections

Figure 6

Figure 15 of the California Waterworks Standards

Furthermore, it is generally recommended that systems have adequate storage to meet the MDD over a two to three day period in the event that wells are out of service or there is a power outage at the supply wells. The necessary storage to provide the MDD for two days equates to approximately 432,000 gallons (150 gpm x 60 minutes x 24 hours x 2 days).

g. Pipeline

The distribution system pipeline locations and sizes are shown on Figure 4 herein. Approximately 17,000-feet (or 85% of the main line piping) of the distribution system piping was replaced in 1999 with six-inch (6”) PVC. This portion of the distribution system appears to be in good condition with no reported areas of high maintenance or leaks.

The distribution system also has five locations of 2-inch dead-end water lines that are an on-going problem. The District does not have a means of flushing these lines and customers complain about smelly, dirty water. These two-inch dead-end lines exist on Avenue 24 to the east and to the west of Road 84, along Avenue 28 to the west of Road 84, along Avenue 32 to the east of Road 84, and along Avenue 36 to the east of Road 84, see Figure 4 herein. In addition, the 2-inch water lines along Avenue 24 are installed with only 18” to 24” of cover.

Gate valves throughout the system are difficult to locate because they have been buried under 4-inches of asphalt pavement. This prevents the District from being able to isolate a portion of the system in the event of a water main break and therefore must shut down the entire system to perform a repair.

h. Pump Stations

The location of the pump station is at the 42,000 gallon tank site and is shown on Figure 4 herein. The pump station consists of three booster pumps and a 5,000 gallon hydropneumatic tank.

Table 7
Pump Summary

Booster Pumps	**Pump #1**	**Pump #2**	**Pump #3**
Flow Rate (gpm)	175	175	250
Motor Size (hp)	10	10	15
Pump Type	End Suction	End Suction	End Suction
Pump Speed (rpm)	3500	3500	3500

The condition of the pump station appears adequate although the system needs cleaning and painting.

i. Operational Management

-Water Meters
There are currently 148 service meters in the ACSD system.
There are two water supply wells each equipped with a propeller flow meter.

-SCADA System

A SCADA system does not currently exist for the water system.

-Other System Management Issues
There currently is one licensed operator employed to operate the system – Susie Rodriguez, D1, License No. 36163.

There are currently no control valves within the distribution system. A pressure sustaining control valve is installed on the storage tank inlet that is for purposes of filling the storage tank.

The two existing water supply sites are two and a half to three miles east of the Allensworth community and located in a remote area. The well sites have had problems with theft and vandalism as a result of their remote location. Chain link fencing with barbed wire has not served as a deterrent as it is merely cut and removed.

The water system is also not equipped with automated chlorination for the wells or the storage tank facility. Currently the District only chlorinates as needed and when they do they access the tank roof access using an extension ladder tied to the tank and manually add chlorine to the tank.

Financial Status of Existing Facilities

The total number of water service connections is 148.

The current annual income is generated from water customers in accordance with the following monthly rate structure:

- Residential Customer – Base Rate (<1,000 cf) $42.00
  Increase for every 500 cf after 1,000 cf: $2.40
- Commercial Customer – Base Rate (<1,000 cf) $84.00
  Increase for every 500 cf after 1,000 cf: $4.80
- Allensworth State Park (<65,000 cf) $1,200.00
  Increase for every 1,000 cf after 65,000 cf $18.00
- Allensworth School (<65,000 cf) $576.00
  Increase for every 1,000 cf after 65,000 cf $6.00

Table 8
Current User Categories

Description	*Metered Connections*
Single Family Residential	146
School	1
State Historic Park	1
Total:	*148*

EDU Calculation

An equivalent dwelling unit (EDU) calculation is shown below in accordance with USDA RD methods.

Table 9
EDU Calculation

User Type	Avg. Monthly Water Usage (Gallons)	Number of Users (Connections)	Avg. Monthly Usage per Connection (Gallons)	Number of EDUs
Residential (Single Family)	2,513,504	146	17,216	146
School	197,435	1	197,435	12
State Historic Park	159,947	1	159,947	9
Other	NA			
			Total:	167

The 2012/2013 fiscal year budget is attached in Table 10. The budget accounts for wages, taxes, professional services, office expenses, debt repayments, operation and maintenance expenses, and utilities.

Table 10
Allensworth Fiscal Budget

ALLENSWORTH COMMUNITY SERVICES DISTRICT
FISCAL BUDGET

BUDGET CATEGORY	2011-2012	2012-2013
VAGES / SALARIES / BENEFITS		
Salaries & Wages	$35,323	$35,323
Interest Expense	$4,264	$4,264
Professional Services (Legal, Eng., etc)	$16,740	$16,740
Legal	incl above	
Accounting	incl above	
Other	$14,303	$14,303
Annual Sub-Total	$70,630	$70,630
OFFICE and GENERAL OPERATIONS		
Fees & Permits	$250	$250
Postage		
Insurance- Workers Comp		
Insurance- Liability	$4,923	$4,923
Bad Checks/NSF	$180	$180
Refunds	$261	$261
Advertising		
Travel		
Office Expense and Printing	$4,910	$5,033
Other		
Annual Sub-Total	$10,524	$10,647
DEBT PAYMENTS		
Taxes		
Debt Payments	$6,845	$6,845
Annual Sub-Total	$6,845	$6,845
OPERATION & MAINTENANCE		
Equipment Rental	$200	$200
Supplies & Maintenance	$1,525	$1,525
Chlorination		
Small equipment / Vehicle	$300	$300
Telephone		
Fuel	$2,775	$2,775
Water Testing	$2,500	$3,000
Annual Sub-Total	$7,300	$7,800
UTILITY COSTS		
Utilities (Electrical and Other)	$18,663	$18,663
Annual Sub-Total	$18,663	$18,663
RESERVE FUND CASH ACCOUNTS		
Reserve for Short lived Assets	$0	$0
Operating Reserves	$0	$0
TOTAL OF ABOVE ANNUAL EXPENSES	$113,962	$114,585
REVENUES		
Water Fees	$107,936	$107,936
Interest Income	$77	$77
Miscellaneous Revenue	$500	$500
TOTAL OF ABOVE ANNUAL REVENUES	$108,513	$108,513

Currently there are no capital improvement programs.

The existing debt is a note payable to the USDA due in 40 annual payments of $6,226 including interest at 4.50% per annum. The original note was $114,540.00 which is currently at $95,660.00. There is also a note payable to the County of Tulare of 60 monthly payments of $431.00 that started in November 2008 and a note payable to Self Help Enterprises of 36 monthly payments of $188.00 that started in October 2011.

Water/Energy/Waste Audits

A water audit has not been performed for the system.

A hydraulic analysis was performed on the existing system using Haestad Methods WaterCad. System pressure is provided by the booster pump station located at the storage tank site. The storage tank is filled by a dedicated pipeline from the two wells. The system pressure ranges between 35 psi and 55 psi under peak hour conditions. A fire flow analysis was performed on the system using a demand of ½ PHD plus fire. While maintaining a residual pressure of 25 psi, the system is able to deliver approximately 700 gpm fire flow to all hydrants within the system. However, this duration is limited as a result of the system storage capacity. A full tank has only enough capacity for approximately 45 minutes.

A copy of the most recent sanitary survey performed by the County of Tulare Health & Human Services Agency Environmental Health Services Division is attached.

IV. NEED FOR PROJECT

Health, Sanitation, and Security

The system relies upon two groundwater wells for its water supply. Well No. 1 was drilled in 1984 and is perforated from 185-ft to 240-ft below ground surface. The Arsenic concentration has varied between 10 ppb and 14 ppb since 2005. Well No. 2 was drilled in 1998 and is perforated from 100-ft to 150-ft, 170-ft to 240-ft, and 270-ft to 305-ft below ground surface. The Arsenic concentration has had several results that exceed the MCL since 2007 and typically ranges from 7 ppb to 14 ppb. The Allensworth CSD received a compliance order from the County of Tulare Environmental Health Services Division on December 21, 2010 for operating water supply wells that exceed the Arsenic MCL of 10 ppb. See the attached compliance order and water quality history.

Aging Infrastructure

The main water distribution system piping is relatively new – less than 15 years old; however the 2-inch dead-end lines are older and are a maintenance problem. The District is unable to flush these pipelines and customers complain of the water smell and appearance. In addition the 2-inch pipelines along Avenue 24 are very shallow and should be buried deeper.

Gate valves within the system are difficult to locate as a result of being paved over by 4-inches of asphalt pavement. This prevents the District from being able to properly isolate portions of the system in the event of repairs as opposed to shutting down the entire system and negatively affecting the community.

The existing storage tank has peeling paint and rusting on the tank interior, has a broken liquid level indicator, and does not have an exterior access ladder. The District operator climbs an extension ladder tied to the top of the tank to access the roof hatch for adding chlorine and for inspecting the tank interior. This is a safety concern and must be addressed.

Growth

The community of Allensworth has not experienced significant growth over the past 10 to 20 years and this is not expected to significantly change. At the projected growth rate of 4% per year, the estimated population in 2020 would be 670 and the service connections would be approximately 210. In 2030, the population would be approximately 954 and the service connections would be approximately 299. Based on this growth estimate, the maximum day demand would be approximately 212 gpm in 2020 and 302 gpm in 2030. Three wells each with a capacity of 125 gpm to 150 gpm (Total = 375 gpm to 450 gpm) would meet the maximum day demand. The District would possibly need to add a second storage tank in order to maintain two days worth of storage capacity.

V. ALTERNATIVES CONSIDERED

The following alternatives were considered to provide the ACSD with a safe and reliable source of water supply:

Alternative 1 – Upgrade the current facilities
Alternative 2 – Connect to a nearby water system
Alternative 3 – Construct Arsenic treatment
Alternative 4 – Construct a new well

Table 11
Project Component Alternatives

Proposed Project Component	Alternatives Description
Water Supply	a. Connect to the Angiola Water District b. Construct a New Water Supply Well
Treatment	a. Construct Arsenic Treatment
Storage	a. Construct a 500,000 gallon Storage Tank
Pipeline	a. Provide Flushing Points and New Isolation Valves
Pump Station	a. Does not address project need.
Operational Management	a. Well Site Fencing with Barbed Wire b. Well Site Security Cameras and Motion Actived Lights c. Installation of SCADA System d. Installation of Chlorine Chemical Injection e. Installation of Aggregate Base surfacing on Well Site Access Rd

ALTERNATIVE 1 – Upgrade the current facilities

Description

Alternative 1 considers upgrading the current facilities to try and resolve the issues. Upgrading the current facilities will address issues with the remote location of the existing water supply wells. However, upgrading the facilities does not address the water quality issue in both wells, as a new source of supply is required or treatment of the existing supply sources must be constructed. It is possible that the Arsenic level in Well No. 2 could be lowered below 10 ppb by filling the lowest perforated interval, 270-ft to 305-ft, with concrete. The well was previously constructed with a blank section from 230-ft to 260-ft and included a 10-ft bentonite seal from 240-ft to 250-ft. This will allow for the sealing off of the deeper perforated interval if it has the higher arsenic concentration. This is currently being studied under a separate project however it does not address the water quality problem in Well No. 1. Well No. 1 was not constructed similar to Well No. 2 and is perforated from 185-ft to 240-ft without an intermediate seal. Therefore this alternative is considered not feasible for addressing the current water system issues.

To address the remainder of the system's deficiencies, Alternatives 2, 3, and 4 also include the construction of a 500,000 gallon welded steel storage tank and booster pump station along with installation of well site security measures and a SCADA system for communication and monitoring of the remote well sites. It is also recommended that new isolation gate valves be installed or raise to grades

performed, flushing valves be added at the end of 2-inch pipelines, and a chlorine tank and chemical pump be added at the tank inlet line. Well site security improvements would consist of 8-ft tall chain link fencing with barbed wire, surveillance cameras with motion activated lights connected to SCADA, and all-weather access roads.

The SCADA (Supervisory Control and Data Acquisition) system is a centralized system that will monitor and control remote sites such as the water supply sites and the storage tank and booster pumping plant site. The SCADA system will communicate operating parameters for each facility such as tank level, run status, flowrates, pressures, and alarm events. It will also allow the operator to change setpoints and run status of pumps. In addition the SCADA system will allow data to be fed to a database that can be used to provide trending and historical data of flows, pressures, and levels.

ALTERNATIVE 2 – Connect to a Nearby Water System

a) Description

Alternative 2 considers the connection to an existing nearby water system. The Alpaugh Community Services District and the Allensworth CSD each have considered obtaining water from the Angiola Water District. Angiola is located approximately twelve (12) miles from the Allensworth CSD.

b) Design Criteria

The Angiola Water District has two existing wells that meet all Title 22 Drinking Water Standards according to the District. These wells were drilled around 1949 and pump shallow groundwater into open ditches or canals. Therefore, in order to pump water to Alpaugh and Allensworth, these well facilities would require modifications to the well pumps, motors, piping, appurtenances, and electrical. In addition, it is likely that Angiola Water District will need to permit these two wells as municipal water supply wells through the County of Tulare Environmental Health Services Division or the California Department of Public Health. The California Department of Public Health has indicated they would not permit these wells for municipal purposes due to their age. Therefore new wells may have to be drilled of similar construction and in close proximity to these two wells. Angiola estimates that these two wells combined can produce approximately 1,500 gpm. The District therefore has adequate capacity to supply a peak of approximately 180,000 gallons per day or an average of approximately 100,000 gallons per day to the Allensworth CSD. Peak flows for the Allensworth CSD would range between 250 gpm to 500 gpm which leaves a minimum of 1,000 gpm capacity for Alpaugh.

A 12-inch PVC transmission pipeline is estimated to be installed approximately 6-miles from the Angiola Water District to the tee for the Alpaugh CSD. A 10-inch PVC transmission pipeline would then continue from the tee to Alpaugh

approximately 6-miles to the Allensworth CSD in order to provide fire flow capacities of 1,000 gpm. The proposed pipeline would convey well water to a new 500,000 gallon welded steel storage tank and booster pumping plant in Allensworth along with a tee and future connection along the alignment to the Alpaugh CSD.

A direct route along Highway 43 has been utilized for purposes of this report, however a more detailed study is being performed under a separate project funded by the County of Tulare. That study may recommend other alignments, however if the pipeline is routed along roadways then the length may be even greater. A more direct route across private property may be an option, however access to the pipeline and the ability to drive the alignment frequently for monitoring and inspection must be considered.

In addition the other system deficiencies must be addressed. Alternative No. 2 includes a 500,000 gallon welded steel storage tank, 60-ft diameter by 24-ft tall, with concrete ringwall foundation and a booster pumping station. Site security system improvements will be made to the two well sites that includes fencing with barbed wire, surveillance cameras with motion activated lights, and an all-weather access road. The electrical and controls of the existing well sites will be upgraded and a SCADA system installed that allows for monitoring of the remote well sites from the District office. In addition, flushing valves shall be added at the end of the 2-inch main lines and distribution system gate valves located and raise to grades performed.

c) Map

A map of the proposed alignment for Alternative No. 2 is attached.

d) Environmental Impacts

The environmental impacts for this alternative are expected to be minimal and to result in a mitigated negative declaration. The project is primarily a below ground water pipeline and a storage tank. This will result in ground disturbance, provisions for trench escape of wildlife, dust control with water trucks, and noise mitigation by restricting work hours to normal working hours.

e) Land Requirements

Pipeline easements will need to be acquired for any locations along the pipeline alignment that are not in the County or State road right-of-way. In addition, a one-acre site will need to be acquired for the 500,000 gallon storage tank and booster pumping plant. This site has not been agreed upon at this point, but is preferred to be along Road 84 in the vicinity of the existing tank site.

f) Potential Construction Problems

The primary potential construction problem with Alternative No. 2 is underground utility conflicts. Underground utility conflicts are bound to be encountered over a pipeline length of approximately 12-miles, however the water pipeline will be a pressurized pipeline and will be able to be routed over and under these potential conflicts if necessary. In addition during the design phase, efforts to locate and pothole all existing utilities would be performed to minimize conflicts during construction.

g) Sustainability Considerations

1) Water Efficiency: Water will be conveyed approximately 12-miles from the Angiola Water District to a 500,000 gallon storage tank at the Allensworth CSD. A flow meter will be installed at the discharge point from the Angiola well field to the Alternative No. 2 transmission main. In addition, a flow meter will be installed at the ACSD tank inlet pipeline. Although it is understood that two in-line flow meters never match, the two flow meters will be utilized to make sure the readings are close. In the event of large discrepancies the District will inspect the system for leaks or places where water may be being stolen.

2) Energy Efficiency: The ACSD 500,000 gallon storage tank will be able to be filled at night by the Angiola Water District wells and the two existing ACSD wells. This will allow the Allensworth CSD to take advantage of time of use pumping and pump their wells during the night to blend in the storage tank and avoid pumping during peak energy periods. The booster pumping plant will operate through the peak energy periods, however it is a less significant lift than lifting from below the ground surface.

3) Other: This alternative is simple to operate. The tank will be filled by the Angiola wells and the two existing ACSD water supply wells based on tank level. The well flow rates and the Angiola water fill rate will be controlled by a PLC to ensure that sufficient volumes from each are pumped into the tank to allow blending of the Arsenic concentration below 8 ppb.

h) Cost Estimate

A cost range has been provided for this alternative. As previously mentioned, a more detailed study of this alternative is being performed under a County of Tulare Project. This report will be updated to reflect that study and the associated costs as more information becomes available. The capital cost range for this alternative is approximately $4,500,000 to $6,500,000. This includes costs for the well drilling and equipping, conveyance piping and appurtenances, special crossings, connections, a new 500,000 gallon storage tank and booster pump station in Allensworth along with well site security measures and a new SCADA system. The

capital costs for the new municipal supply wells and transmission pipeline for consolidation of Angiola Water District, Alpaugh CSD, and Allensworth CSD would likely be pro-rated among the Alpaugh CSD and Allensworth CSD therefore reducing the capital costs of this alternative to the Allensworth CSD.

Non-construction costs for construction inspection, contract administration, legal counsel, labor compliance, and construction staking are included in the cost range.

O&M costs consist of the purchase price of the water from the Angiola Water District. The District has estimated that the current cost to pump these wells is approximately $104 per acre-ft. For estimating purposes, the value of this water has been assumed to be $200 per acre-foot which accounts for increased electricity costs due to higher pumping heads and additional maintenance and monitoring. This water would be used to blend with the two existing wells in the new storage tank. Assuming that this source would provide half of the water required by the system, yearly O&M costs would be approximately $12,000.00 or 58 ac-ft / year x $200.00 / ac-ft.

This interconnection would serve as the primary source of supply to the ACSD system while the two existing water supply wells could remain active and be used to supplement the purchased water and blend the Arsenic concentration in the storage tank below the MCL. This provides multiple sources of supply in the event that a well is out of service due to repairs or maintenance.

This alternative is a potential solution to addressing the water supply issues of the ACSD, however it is the most expensive alternative from a construction standpoint and the O&M costs would add potentially $5 to $15 per month to each customer's water bill.

ALTERNATIVE 3 – Arsenic Treatment System

a) Description

Alternative 3 involves the installation of an arsenic treatment system to treat water from both Well No. 1 and Well No. 2 and then discharge into a new storage tank and booster pump station.

b) Design Criteria

The arsenic treatment system would be designed to treat approximately 300 gpm to 400 gpm. This is the estimated production from both wells.

Two treatment technologies would be considered – 1) adsorption and 2) coagulation-filtration.

Adsorption uses an iron based filter media to remove arsenic from the raw water. In addition this method would require addition of sodium hypochlorite to oxidize the arsenic and pH adjustment to lower the pH to around 7. The filter media would be operated until it reached break through and required replacement. Adsorption media can be replaced, regenerated on-site, or regenerated at the manufacturing facility. The life of the media is the most critical component of the operation and maintenance costs and would be confirmed during pilot testing.

Coagulation-filtration uses addition of sodium hypochlorite to oxidize the arsenic, addition of acid to lower the pH to around 7, addition of ferric chloride to precipitate the dissolved arsenic, and then filtration of the water through a proprietary iron based media or a greensand. This filtration system requires frequent (daily) backwashing and typically the water is backwashed into a storage tank that will allow the arsenic sludge to settle to the bottom of the tank. The supernatant is then pumped back to the headworks of the treatment system for treatment and use in the distribution system. The arsenic sludge that is accumulated in the bottom of the backwash tank must then be removed and disposed of at a hazardous waste facility. This is typically done on a semi-annual or annual basis.

In general, adsorption treatment technology is more simple to operate and maintain while coagulation-filtration is often times the more economical treatment system when considering operation and maintenance costs. Each of these treatment technologies will need to be pilot tested and the results evaluated in order to determine the best treatment method for the Allensworth system.

In addition the other system deficiencies must be addressed. Alternative No. 3 includes a 500,000 gallon welded steel storage tank, 60-ft diameter by 24-ft tall, with concrete ringwall foundation and a booster pumping station. Site security system improvements will be made to the two well sites that includes fencing with barbed wire, surveillance cameras with motion activated lights, and an all-weather access road. The electrical and controls of the existing well sites will be upgraded and a SCADA system installed that allows for monitoring of the remote well sites from the District office. It is also recommended that new isolation gate valves be installed or raise to grades performed, flushing valves be added at the end of 2-inch pipelines, and a chlorine tank and chemical pump be added at the tank inlet line.

c) Map

A map of the proposed treatment system for Alternative No. 3 is attached.

d) Environmental Impacts

The environmental impacts for this alternative are expected to be minimal and to result in a mitigated negative declaration. The project is primarily a water treatment plant and a storage tank. This will result in mitigation measures for dust control with water trucks, provisions for wildlife such as preconstruction surveys and other

measures, noise mitigation by restricting work hours to normal working hours, and hazardous waste transport and disposal of arsenic sludge to an approved landfill.

e) Land Requirements

A one-acre to one and half acre site will need to be acquired for the 500,000 gallon storage tank, booster pumping plant, and arsenic treatment facility. This site has not been agreed upon at this point, but is preferred to be on the west side of Road 84 across from the existing tank site.

f) Potential Construction Problems

The primary potential construction problem with Alternative No. 3 is access to the well sites for project improvements especially during wet periods. It would be recommended that the aggregate base surfacing for the well site access roads be installed at the beginning of the project to improve the access to the project area.

g) Sustainability Considerations

1) Water Efficiency: Water will be utilized for backwashing of the treatment media on a daily basis. This backwash water will be contained in a storage tank and provided time for the arsenic sludge to settle to the bottom of the tank. The tank backwash water will then be reclaimed and pumped to the headworks of the treatment plant such that this water is not wasted.

2) Energy Efficiency: The ACSD 500,000 gallon storage tank will be able to be filled at night by the two existing ACSD wells. This will allow the Allensworth CSD to take advantage of time of use pumping and pump their wells during the night and avoid pumping during peak energy periods. The booster pumping plant will operate through the peak energy periods, however it is a less significant lift than lifting from below the ground surface.

3) Other: This alternative is more complex to operate and maintain and will require the District to train or hire a T2 Treatment Operator. In addition, it will cause the District to become a generator of hazardous waste material in the form of an arsenic sludge.

h) Cost Estimate

The cost for this alternative includes costs for replacing the well pump and motors, upgrading the electrical facilities, installing a treatment system and appurtenances, installing a storage tank and booster pump station, and installing well site security measures and a SCADA system. The capital cost for this alternative is estimated to be $3,299,140.00. Non-construction costs for construction inspection, contract

administration, legal counsel, labor compliance, and construction staking are included.

Table 12

Alternative No. 3 – Capital Cost Estimate

Alternative No. 3

Construct Arsenic Treatment

Capital Cost Estimate

Item No.	Item Description	Unit	Quantity	Unit Cost	Extended Cost
1	Land Acquisition	LS	1	$25,000.00	$25,000.00
2	Mobilization/Demobilization/Cleanup	LS	1	$35,000.00	$35,000.00
3	Construct Piping & Appurtenance Modifications	LS	1	$100,000.00	$100,000.00
4	Construct Treatment Concrete Foundation	LS	1	$50,000.00	$50,000.00
5	Furnish & Install Treatment Vessels	LS	1	$400,000.00	$400,000.00
6	Construct Concrete Foundation & Chemical Bldgs	LS	1	$70,000.00	$70,000.00
7	Furnish & Install Sodium Hypochlorite	LS	1	$10,000.00	$10,000.00
8	Furnish & Install Sulfuric Acid	LS	1	$10,000.00	$10,000.00
9	Furnish & Install Ferric Chloride	LS	1	$10,000.00	$10,000.00
10	Construct Backwash Recovery Tank	LS	1	$50,000.00	$50,000.00
11	Construct Backwash Piping & Appurtenances	LS	1	$50,000.00	$50,000.00
12	Construct Backwash Supply Tank	LS	1	$100,000.00	$100,000.00
13	Construct Backwash Supply Pipe & Appurtenances	LS	1	$50,000.00	$50,000.00
14	Site Grading	LS	1	$15,000.00	$15,000.00
15	Well Pump & Motor Modifications	LS	1	$20,000.00	$20,000.00
16	Electrical Modifications	LS	1	$30,000.00	$30,000.00
17	Site Electrical and Controls	LS	1	$150,000.00	$150,000.00
18	Site Fencing and Drive Gates	LF	500	$25.00	$12,500.00
19	Site Securtiy System	LS	1	$10,000.00	$10,000.00
20	Site Ground Cover	LS	1	$20,000.00	$20,000.00
21	Site Painting	LS	1	$5,000.00	$5,000.00
22	6" PVC Well Conveyance Piping	LF	600	$30.00	$18,000.00
				Treatment Site Subtotal:	*$1,240,500.00*
23	Land Acquistion for Storage Tank	LS	1	$25,000.00	$25,000.00
24	Mobilization/Demobilization/Cleanup	LS	1	$50,000.00	$50,000.00
25	Site Grading	LS	1	$25,000.00	$25,000.00
26	Concrete Ringwall Foundation	LS	1	$25,000.00	$25,000.00
27	500,000 Gallon Welded Steel Storage Tank (60-ft diameter by 24-ft tall)	LS	1	$450,000.00	$450,000.00
28	Tank Overflow Piping	LS	1	$15,000.00	$15,000.00
29	Tank Drain	LS	1	$5,000.00	$5,000.00
30	Tank Inlet	LS	1	$25,000.00	$25,000.00
31	Booster Pump Station & Appurtenances	LS	1	$150,000.00	$150,000.00
32	Hydropnuematic Tank Control Modifications	LS	1	$35,000.00	$35,000.00
33	Site Electrical and Controls	LS	1	$150,000.00	$150,000.00
34	Site Fencing and Drive Gates	LF	500	$25.00	$12,500.00
35	Site Securtiy System	LS	1	$10,000.00	$10,000.00
36	Site Ground Cover	LS	1	$20,000.00	$20,000.00
37	Site Painting	LS	1	$5,000.00	$5,000.00
38	6" PVC Conveyance Piping	LF	660	$30.00	$19,800.00
39	Well Site Security Measures	LS	1	$200,000.00	$200,000.00
40	Install Flushing Valves & Perform Raise to Grades	LS	1	$25,000.00	$25,000.00
41	SCADA System	LS	1	$50,000.00	$50,000.00
				Tank Site Subtotal:	*$1,297,300.00*
				Project Subtotal:	*$2,537,800.00*
				20% Contingency:	*$507,560.00*
				Construction Management & Administration:	*$253,780.00*
				Total Estimate:	***$3,299,140.00***

The operation and maintenance costs are also a significant factor in the evaluation of the alternatives. Listed below are estimates of the annual O&M costs associated with the arsenic treatment system for this alternative.

- $14,000 Sodium Hypochlorite
- $15,000 Sulfuric Acid
- $2,500 Ferric Chloride
- $1,000 Bag Filters
- $15,000 Arsenic Waste Disposal
- $10,000 Preventative Maintenance Cost
- $15,000 Media Replacement ($150,000 every ten years)

$72,500 Treatment System Annual O&M cost.

This alternative has the highest O&M cost of any of the alternatives. The high O&M costs make this alternative less desirable for the District.

This option would eliminate the water quality problem and address the system storage capacity and communication issues. However installing treatment adds a degree of operational complexity, will require a T2 Operator, and adds annual operations and maintenance costs that are over 50% of their entire budget. This alternative has the most significant impact to the water systems ongoing operations and maintenance expenses.

ALTERNATIVE 4 – Construct a New Well

a) Description

This alternative consists of drilling a new well in the area southeast of the community and constructing a pipeline to convey the water to the ACSD system.

b) Design Criteria

The new well is estimated to be a 10-inch steel and PVC casing drilled to a depth of approximately 300-ft. The well alternative includes site grading, concrete foundations, submersible pump and motor, well discharge piping and appurtenances, chlorination system, electrical and controls, site fencing, site security system, site painting, site ground cover, and 6” PVC conveyance piping. The new well design would be based upon the results of a casing hammer test well.

In addition the other system deficiencies must be addressed. Alternative No. 4 includes a 500,000 gallon welded steel storage tank, 60-ft diameter by 24-ft tall, with concrete ringwall foundation and a booster pumping station. Site security system improvements will be made to the two well sites that includes fencing with

barbed wire, surveillance cameras with motion activated lights, and all-weather access roads. The electrical and controls of the existing well sites will be upgraded and a SCADA system installed that allows for monitoring of the remote well sites from the District office. It is also recommended that new isolation gate valves be installed or raise to grades performed, flushing valves be added at the end of 2-inch pipelines, and a chlorine tank and chemical pump be added at the tank inlet line.

c) Map

A map of the proposed well site for Alternative No. 4 is attached.

d) Environmental Impacts

The environmental impacts for this alternative are expected to be minimal and to result in a mitigated negative declaration. The project is primarily a new water well site and a storage tank. This will result in mitigation measures for dust control with water trucks, provisions for wildlife such as preconstruction surveys and other measures, and noise mitigation by restricting work hours to normal working hours.

e) Land Requirements

It is estimated that this will require the acquisition of approximately ¼ - ½ acre of land for a new well site. The area proposed for the well site is tentatively located to the west of Well No. 2 and is currently farmed for agricultural use. In addition, a one-acre to one and a half acre site will need to be acquired for the 500,000 gallon storage tank and booster pumping plant. This site has not been agreed upon at this point, but is preferred to be on the west side of Road 84 across from the existing tank site.

f) Potential Construction Problems

The primary potential construction problem with Alternative No. 4 is access especially during wet periods. It would be recommended that the aggregate base surfacing for the well site access roads be installed at the beginning of the project to improve the access to the project area.

g) Sustainability Considerations

1) Water Efficiency: Water will be conveyed approximately 3-miles from the District wells to a 500,000 gallon storage tank. A flow meter will be installed at each of the water supply wells before entering the 3-mile 6-inch transmission main. In addition, a flow meter will be installed at the ACSD tank inlet pipeline. Although it is understood that in-line flow meters never match, the combined well flow meters and the tank inlet flow meter will be utilized and compared to make sure the readings are close. In the event of

large discrepancies the District will inspect the system for leaks or places where water may be being stolen.

2) Energy Efficiency: The ACSD 500,000 gallon storage tank will be able to be filled at night by the three ACSD wells. This will allow the Allensworth CSD to take advantage of time of use pumping and pump their wells during the night and avoid pumping during peak energy periods. The booster pumping plant will operate through the peak energy periods, however it is a less significant lift than lifting from below the ground surface.

3) Other: This alternative is similar to operate as to the existing system. The tank will be filled by the three ACSD wells based on tank level. The well flow rates will be controlled by a PLC to ensure that sufficient volumes from each are pumped into the tank to allow blending of the Arsenic concentration below 8 ppb.

h) Cost Estimates

The cost for this alternative includes costs for drilling and equipping a new water supply well, installing a storage tank and booster pump station, existing well site security measures, and installing a SCADA system. The capital cost for this alternative is estimated to be $2,456,700.00. Non-construction costs for construction inspection, contract administration, legal counsel, labor compliance, and construction staking are included.

Table 13

Alternative No. 4 – Capital Cost Estimate

	Alternative No. 4				
	Construct a New Well				
	Capital Cost Estimate				
Item No.	Item Description	Unit	Quantity	Unit Cost	Extended Cost
1	Land Acquisition	LS	1	$25,000.00	$25,000.00
2	Mobilization/Demobilization/Cleanup	LS	1	$35,000.00	$35,000.00
3	Set 50-ft Conductor	LF	50	$350.00	$17,500.00
4	Drill Pilot Hole	LF	350	$45.00	$15,750.00
5	Geophysical Logging	LS	1	$2,500.00	$2,500.00
6	Ream the Pilot Hole	LF	300	$35.00	$10,500.00
7	Install Blank Casing	LF	140	$75.00	$10,500.00
8	Install Louvered Casing	LF	140	$95.00	$13,300.00
9	Install Gravel Feed Tube	LF	100	$9.00	$900.00
10	Install Sounding Tube	LF	300	$5.00	$1,500.00
11	Install Gravel Pack	LF	220	$40.00	$8,800.00
12	Install Cement Annular Seal	LF	80	$45.00	$3,600.00
13	Airlifting & Swabbing	HRS	60	$350.00	$21,000.00
14	Pumping & Surging	HRS	48	$300.00	$14,400.00
15	Production Testing	HRS	24	$300.00	$7,200.00
16	Well Video	LS	1	$1,500.00	$1,500.00
17	Site Grading	LS	1	$15,000.00	$15,000.00
18	Well Foundation	LS	1	$10,500.00	$10,500.00
19	Submersible Pump & Motor	LS	1	$30,000.00	$30,000.00
20	Pump Discharge Piping & Appurtenances	LS	1	$30,000.00	$30,000.00
21	Pump & Motor Enclosure	LS	1	$25,000.00	$25,000.00
22	Sodium Hypochlorite Station	LS	1	$5,000.00	$5,000.00
23	Site Electrical and Controls	LS	1	$150,000.00	$150,000.00
24	Site Fencing and Drive Gates	LF	500	$25.00	$12,500.00
25	Site Securtiy System	LS	1	$10,000.00	$10,000.00
26	Site Ground Cover	LS	1	$20,000.00	$20,000.00
27	Site Painting	LS	1	$5,000.00	$5,000.00
28	6" PVC Well Conveyance Piping	LF	600	$30.00	$18,000.00
				Well Site Subtotal:	*$519,950.00*
29	Land Acquistion for Storage Tank	LS	1	$25,000.00	$25,000.00
30	Mobilization/Demobilization/Cleanup	LS	1	$50,000.00	$50,000.00
31	Site Grading	LS	1	$25,000.00	$25,000.00
32	Concrete Ringwall Foundation	LS	1	$25,000.00	$25,000.00
33	500,000 Gallon Welded Steel Storage Tank (60-ft diameter by 24-ft tall)	LS	1	$450,000.00	$450,000.00
34	Tank Overflow Piping	LS	1	$15,000.00	$15,000.00
35	Tank Drain	LS	1	$5,000.00	$5,000.00
36	Tank Inlet	LS	1	$25,000.00	$25,000.00
37	Booster Pump Station & Appurtenances	LS	1	$150,000.00	$150,000.00
38	Hydropnuematic Tank Control Modifications	LS	1	$35,000.00	$35,000.00
39	Site Electrical and Controls	LS	1	$150,000.00	$150,000.00
40	Site Fencing and Drive Gates	LF	500	$25.00	$12,500.00
41	Site Securtiy System	LS	1	$10,000.00	$10,000.00
42	Site Ground Cover	LS	1	$20,000.00	$20,000.00
43	Site Painting	LS	1	$5,000.00	$5,000.00
44	6" PVC Conveyance Piping	LF	660	$30.00	$19,800.00
45	Well Site Security Measures	LS	1	$200,000.00	$200,000.00
46	Install Flushing Valves & Perform Raise to Grades for Ex. Valves	LS	1	$25,000.00	$25,000.00
47	SCADA System	LS	1	$50,000.00	$50,000.00
				Tank Site Subtotal:	*$1,297,300.00*
				Project Subtotal:	*$1,817,250.00*
				20% Contingency:	*$363,450.00*
				Construction Management & Administration:	*$276,000.00*
				Total Estimate:	***$2,456,700.00***

The operation and maintenance costs are a significant factor in the evaluation of the alternatives. This alternative is expected to have a negligible effect on the overall operation and maintenance costs. The increase in operations and maintenance costs is estimated to be related to additional water quality testing and maintenance. The overall system demands will be the same therefore the electricity costs should remain about the same. The increase in annual operations and maintenance expenses is estimated as $6,000.00.

Assuming a new well can be drilled that does not require treatment, this alternative provides a long term solution to the current system deficiencies. It enables the District to provide an adequate water supply to its customers at all times. If the Arsenic concentration is low enough, the flow rates of the three wells could be controlled such that the water can be blended below the current MCL of 10 ppb for Arsenic in the storage tank and all three wells then remain in service.

Improvements in the systems storage capacity, facility security, and communications and monitoring systems will further enhance the water system safety and reliability.

VI. SELECTION OF AN ALTERNATIVE

a) Life Cycle Cost Analysis

A present worth tabulation for each of the project alternatives is shown in Table 14.

Table 14
Summary of Alternatives

Alternative	*Description*	*Total Project Cost*	*Annual O&M Cost*	*Present Worth O&M*	*Net Present Worth*
No. 1	Upgrades to Existing	Not Feasible			
No. 2	Connection to Nearby System	$4,500,000 to $6,500,000	$12,000	$220,970	$4,720,970 to $6,720,970
No. 3	Construct Arsenic Treatment	$3,299,140	$72,500	$1,335,030	$4,634,170
No. 4	Construct New Well	$2,456,700	$6,000	$110,485	$2,540,510

Three of the four alternatives address the District's water quality issue and of the three, Alternatives No. 3 and No. 4 are the best from a present worth perspective. Alternative 4 is the recommended alternative for resolving the District's water quality issues. Alternative 4 will provide the ACSD with a consistent water supply capable of meeting the community's demands for many years and maintain the lowest monthly cost to the water system customers. This alternative is predicated on a test water well being completed that demonstrates a well can be completed not requiring treatment.

b) Non-Monetary Factors Analysis

The non-monetary factors considered include simplicity of operation, requirement for additional level of training, hazardous waste disposal, and risk associated with meeting future regulations.

Table 15
Non-Monetary Analysis

Alternatives	Simplicity of Operation	Increased Level of Training	Hazardous Waste Generated	Risk with meeting Future Regulations	Weighted Ranking
No. 1	Not Feasible				
No. 2	1	1	1	2	1.25
No. 3	3	2	3	1	2.25
No. 4	2	1	1	2	1.50

Ranking System: 1 = Simplest, No Increase in Training, No Hazardous Waste, or Least Risk. 3 = Most Complex, Most Training, Hazardous Waste, or Most Risk

Alternative No. 2 will be the simplest to operate as the water supply will come from Angiola Water District and ACSD will be responsible for maintaining and operating their wells, the storage tank, and the pumping facilities. Alternative No. 4 is the next simplest to operate as it involves a third well and the operation of the new facilities will be similar to their current operation. Alternative No. 3 is the most complex to operate and will require a T2 treatment operator. In addition, Alternative No. 3 will likely produce an arsenic sludge that is classified as a hazardous waste.

VII. PROPOSED PROJECT (ALTERNATIVE NO. 4)

The proposed project is for a new well to be constructed to the southeast of the community and for a pipeline to be constructed to convey the water to the existing well conveyance piping system. The well would be drilled under close supervision

of the engineer and hydrogeologist in an effort to produce a well with good water production and quality. A test well will be drilled as part of the planning project to determine if a well can be completed without treatment. If treatment cannot be avoided then Alternative No. 2 would become the selected alternative based on the non-monetary factors.

a) Description

Table 16
Project Alternative Summary

Proposed Project Component	Proposed Alternative Description
Water Supply	A new well is proposed. The new well will need to provide 100 gpm to 200 gpm of water that meets all Title 22 Drinking Water Standards. The well site is proposed to the west of the two existing supply wells. The well is proposed to be a 10” steel blank casing and PVC perforated casing to a depth of 300-ft.
Treatment	Treatment is not proposed for this alternative.
Storage	A 500,000 gallon welded steel storage tank, 60-ft diameter by 24-ft tall, is proposed. It is proposed to be located on the west side of Road 84 near the existing tank site along with chlorine chemical injection at the tank fill line.
Pipeline	A 6” C900 PVC pipeline is proposed from the new well to the existing well conveyance main line. The length of 6” pipe is estimated as 600-ft. Flush valves are recommended at the end of each of the 2-inch dead-end main lines as well as locating the existing gate valves and performing raise to grades.
Pump Station	A new 1,000 gpm booster pump station is proposed at the new tank site. The pumps would be end suction and horizontal centrifugal pumps and be staged at (2)-50 gpm, 150 gpm, 300 gpm, and 500 gpm.
Operational Management	The two existing well sites are proposed to have new chainlink fencing with barbed wire and security camera systems with motion activated lights installed. In addition aggregate base surfacing is proposed for the well site access roads and installation of a SCADA system.

A layout map of the proposed project is attached for Alternative No. 4 showing the location of the proposed system components.

b) Project Schedule

Completion of Proposition 84 Planning Project:	October 2014
Estimated Date of Construction Funding:	October 2015
Land and Easement Acquisition:	January 2016
Permit Acquisition:	January 2016
Advertisement of Bids:	Dec. 2015 - Jan. 2016
Contract Award:	January 2016
Notice to Proceed:	February 2016
Construction:	Feb. 2016 – Oct. 2016
Substantial Completion/Start-Up & Testing:	October 2016
Notice of Completion:	November 2016

c) Permit Requirements

The anticipated permit requirements for the project will include a County Encroachment permit for road crossings of pipelines and work in the County right-of-way, a County of Tulare Well Drilling Permit, and a County of Tulare Building Permit.

d) Sustainability Considerations

1) Water Efficiency: Water will be conveyed approximately 3-miles from the District wells to a 500,000 gallon storage tank. A flow meter will be installed at each of the water supply wells before entering the 3-mile 6-inch transmission main. In addition, a flow meter will be installed at the ACSD tank inlet pipeline. Although it is understood that in-line flow meters never match, the combined well flow meters and the tank inlet flow meter will be utilized and compared to make sure the readings are close. In the event of large discrepancies the District will inspect the system for leaks or places where water may be being stolen.

2) Energy Efficiency: The ACSD 500,000 gallon storage tank will be able to be filled at night by the three ACSD wells. This will allow the Allensworth CSD to take advantage of time of use pumping and pump their wells during the night and avoid pumping during peak energy periods. The booster pumping plant will operate through the peak energy periods, however it is a less significant lift than lifting from below the ground surface.

3) Other: This alternative is similar to operate as to the existing system. The tank will be filled by the three ACSD wells based on tank level. The well flow rates will be controlled by a PLC to ensure that sufficient volumes from each are pumped into the tank to allow blending of the Arsenic concentration below 8 ppb.

e) Total Project Cost Estimate

See the completed Table 1 Total Project Cost Estimate attached.

f) Annual Operating Budget

1) Income

The District currently bills its customers as follows:

- Residential Customer – Base Rate (<1,000 cf) $42.00
  Increase for every 500 cf after 1,000 cf: $2.40
- Commercial Customer – Base Rate (<1,000 cf) $84.00
- Increase for every 500 cf after 1,000 cf: $4.80
- Allensworth State Park (<65,000 cf) $1,200.00
  Increase for every 1,000 cf after 65,000 cf $18.00
- Allensworth School (<65,000 cf) $576.00
  Increase for every 1,000 cf after 65,000 cf $6.00

Income sources include monthly billings, late fees, miscellaneous income, and interest income. The total income for the post project fiscal year is estimated as $115,577 which is equivalent to $9,631.42 per month or $57.67 per EDU.

Table 17
Post Project Fiscal Revenues

REVENUES	
Water Fees	$115,000
Interest Income	$77
Miscellaneous Revenue	$500
TOTAL OF ABOVE ANNUAL REVENUES	$115,577

2) Annual Operations and Maintenance (O&M) Costs

The primary O&M costs include wages, insurance, debt repayment, electrical and utilities, fuel, and professional services.

The estimated fiscal year budget after project completion is attached and is summarized below:

Table 18
Post Project Fiscal Budget

ALLENSWORTH COMMUNITY SERVICES DISTRICT
FISCAL BUDGET

BUDGET CATEGORY	After Project Completion
WAGES / SALARIES / BENEFITS	
Salaries & Wages	$35,323
Interest Expense	$4,264
Professional Services (Legal, Eng., etc)	$16,740
Legal	incl above
Accounting	incl above
Other	$14,303
Annual Sub-Total	$70,630
OFFICE and GENERAL OPERATIONS	
Fees & Permits	$250
Postage	
Insurance- Workers Comp	
Insurance- Liability	$4,923
Bad Checks/NSF	$180
Refunds	$261
Advertising	
Travel	
Office Expense and Printing	$5,033
Other	
Annual Sub-Total	$10,647
DEBT PAYMENTS	
Taxes	
Debt Payments	$6,845
Annual Sub-Total	$6,845
OPERATION & MAINTENANCE	
Equipment Rental	$200
Supplies & Maintenance	$1,525
Chlorination	$1,500
Small equipment / Vehicle	$300
Telephone	
Fuel	$2,000
Water Testing	$4,000
Annual Sub-Total	$9,525
UTILITY COSTS	
Utilities (Electrical and Other)	$18,663
Annual Sub-Total	$18,663
RESERVE FUND CASH ACCOUNTS	
Reserve for Short lived Assets	$5,805
Operating Reserves	$1,000
TOTAL OF ABOVE ANNUAL EXPENSES	$123,115

The total O&M cost for the post project fiscal year is estimated as $123,115.00 which is equivalent to $10,259.58 per month or $61.43 per EDU.

3) Debt Repayments

The existing debt for the District is a note payable to the USDA due in 40 annual payments of $6,226 including interest at 4.50% per annum. The original note was $114,540.00 which is currently at $95,660.00. There is also a note payable to the County of Tulare of 60 monthly payments of $431.00 that started in November 2008 and a note payable to Self Help Enterprises of 36 monthly payments of $188.00 that started in October 2011.

The proposed financing for these project improvements is proposed to come from CDPH Proposition 84 Grant Funds and/or SDW SRF and potentially USDA funds.

4) Reserves

The District debt service reserve is estimated as one-tenth of the annual debt payment requirement or approximately $1,365.00.

The short lived asset reserve is shown in Table 19 below.

Table 19
Short-Lived Asset Reserve

Equipment	**Useful Life (Yrs)**	**Replacement Cost**	**Annual Reserve**
Submersible Pump	15	$3,500.00	$235.00
Submersible Motor	15	$2,500.00	$170.00
Misc. Valves / Flow Meters	15	$12,000.00	$800.00
Misc. Instrumentation	10	$5,000.00	$500.00
Booster Pumps	15	$18,000.00	$1,200.00
Pressure Tank Air Compressor	10	$2,500.00	$250.00
Electrical Systems	15	$15,000.00	$1,000.00
Chlorination Feed Pump	10	$1,500.00	$150.00
SCADA Equipment	15	$15,000.00	$1,500.00
		Total:	**$5,805.00**

VIII. CONCLUSIONS AND RECOMMENDATIONS

This firm's recommendation is that Alternative 4 be selected at this time to remedy the water quality, storage capacity, and communication/monitoring issues that plague the District. A test well must first be completed under the SRF planning project in order to determine whether or not Alternative No. 4 is feasible from the standpoint of avoiding water treatment. A test well is recommended to be drilled by the casing hammer method into the Corcoran Clay which is estimated to be around a depth of 380-ft. This test well would be drilled west of Well No. 2 and is based upon previous hydrogeologic reports of the area. The casing hammer test well will allow for accurate water quality sampling at several depths to determine if there is a zone where water can be obtained that meets all Title 22 Drinking Water Standards. If this test well is unsuccessful in finding suitable water, a second test well would be recommended east of Well No. 1 if the budget allows. If Alternative No. 4 is determined to not be feasible upon completion of the test well, then Alternative No. 2 will become the recommended alternative for the reasons noted herein.

REFERENCES

Cleath, Timothy S. and Barto, Ronald L., James M. Montgomery, Consulting Engineers, Inc., Water System Improvements Report, October 15, 1982

California Department of Fish and Wildlife, Map of Allensworth Ecological Reserve, Tulare and Kern Counties, March 2013

California Department of Water Resources, Basic Well Log Data

Self-Help Enterprises, Inc.; Allensworth File

Allensworth Community Services District

APPENDIX A

USDA Table 1 – Total Project Cost Estimate

APPENDIX B

Figures/Maps and Cost Estimates

APPENDIX C

Sanitary Survey Report for Allensworth Community Services District

APPENDIX D

Notice of Violations / Compliance Orders

APPENDIX E

Water Quality History

APPENDIX F

Financial Statements with Independent Auditor's Report Dated June 30, 2012